

The Second-Phase Development of the China JinPing Underground Laboratory for Physics Rare-Event Detectors and Multi-Disciplinary Sensors

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The expansion of the China JinPing Laboratory (CJPL) is planned along a main branch of a bypass tunnel in the JinPing tunnel complex during 2013 -2015. This second phase of CJPL will have laboratory space increased to approximately 80,000m³, from existing main hall volume of nearly 2,000m³. One configuration designed has eight additional hall spaces planned, with each over 60 m long, width in the order of 12 m, and overburdens in excess of 2 km, in the direction parallel to and away from the main water transport and auto traffic tunnels. It is noted that there are additional possibilities of further expansions at a nearby second bypass tunnel and along the entrance and exit branches of both bypass tunnels, making the expanded CJPL comparable in size to the space available at Gran Sasso. Concurrently with the excavation activities, there are plans being formed for dark matter search and other rare-event detectors as well as for geophysics/engineering and other coupled multi-disciplinary sensors. In the town meeting on September 8, 2013 at Asilomar, CA, associated with the 13th International Conference on Topics in Astroparticle and Underground Physics (TAUP), discussions included one-ton expansions of current CJPL setups of Germanium detector in the China Darkmatter EXperiment (CDEX) and two-phase Xenon detector of the PandiX experiment, other dark matter detectors, scintillation solar neutrino detectors, neutrino-less double beta detectors, nuclear astrophysics synthesis accelerators, bubble chamber room temperature detectors, and many other experimental and detector ideas from many contributions and during the panel discussions. Examples of geophysics/engineering sensor included rock burst monitoring with acoustic emissions during excavation and in long-term monitoring phases, coupled process in situ measurements, local, regional, and global monitoring of seismic-induced radon emission and electromagnetic signals, and other studies. Additional ideas and projects are expected to be developed in the next few years, pending on China's domestic needs and international demands of the world deepest and relatively large spaces associated with underground sciences.

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